



SEQUENCE LISTING

<110> Hanley-Bowdoin, Linda
Orozco, Beverly M.
Kong, Ling-Jie
Gruissem, Wilhelm

<120> GEMINIVIRUS RESISTANT TRANSGENIC PLANTS

<130> Hanley-Bowdoin et al.

<140> 09/289,346

<141> 1999-04-09

<150> 60/125,004

<151> 1999-03-18

<160> 16

<170> PatentIn Ver. 2.1

<210> 1

<211> 70

<212> PRT

<213> Tomato golden mosaic virus

<400> 1

Thr Leu Val Trp Gly Glu Phe Gln Val Asp Gly Arg Ser Ala Arg Gly
1 5 10 15

Gly Cys Gln Thr Ser Asn Asp Ala Ala Ala Glu Ala Leu Asn Ala Ser
20 25 30

Ser Lys Glu Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys
35 40 45

Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe
50 55 60

Asp Lys Thr Pro Glu Pro
65 70

<210> 2

<211> 70

<212> PRT

<213> Tomato golden mosaic virus

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AUG 29 2000

TECH CENTER 1600/2000

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AUG 31 2000

TECH CENTER 1600/2000

<220>
 <221> VARIANT
 <222> (12)..(15)
 <223> Description of Artificial Sequence: Fragment of
 TGMV Rep Protein (aa 110-179) with alanine
 replacement (RSAR125->AAAA125).

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<400> 2
 Thr Leu Val Trp Gly Glu Phe Gln Val Asp Gly Ala Ala Ala Gly
 1 5 10 15
 Gly Cys Gln Thr Ser Asn Asp Ala Ala Ala Glu Ala Leu Asn Ala Ser
 20 25 30
 Ser Lys Glu Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys
 35 40 45
 Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe
 50 55 60
 Asp Lys Thr Pro Glu Pro
 65 70

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<210> 3
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 <213> Tomato golden mosaic virus

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 <222> (27)..(36)
 <223> Description of Artificial Sequence: Fragment of
 TGMV Rep Protein (aa 110-179) with alanine
 replacements (EALNASSKEE->AALAASSAAA)

<400> 3
 Thr Leu Val Trp Gly Glu Phe Gln Val Asp Gly Arg Ser Ala Arg Gly
 1 5 10 15
 Gly Cys Gln Thr Ser Asn Asp Ala Ala Ala Ala Ala Leu Ala Ala Ser
 20 25 30
 Ser Ala Ala Ala Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys
 35 40 45
 Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe
 50 55 60

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Asp Lys Thr Pro Glu Pro
65 70

<210> 4
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<212> PRT
<213> Tomato golden mosaic virus

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<222> (42)..(44)
<223> Description of Artificial sequence: Fragment of
TGMV Rep Protein (aa 110-179) with alanine
replacements (REK154->AAA154).

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Thr Leu Val Trp Gly Glu Phe Gln Val Asp Gly Arg Ser Ala Arg Gly
1 5 10 15

Gly Cys Gln Thr Ser Asn Asp Ala Ala Ala Glu Ala Leu Asn Ala Ser
20 25 30

Ser Lys Glu Glu Ala Leu Gln Ile Ile Ala Ala Ala Ile Pro Glu Lys
35 40 45

Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe
50 55 60

Asp Lys Thr Pro Glu Pro
65 70

<210> 5
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<213> Tomato golden mosaic virus

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<223> Description of Artificial Sequence: Fragment of
TGMV Rep Protein (aa 110-179) with alanine
replacements (EKY159->AAA159).

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1 5 10 15
 Gly Cys Gln Thr Ser Asn Asp Ala Ala Ala Glu Ala Leu Asn Ala Ser
 20 25 30
 Ser Lys Glu Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Ala Ala
 35 40 45
 Ala Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe
 50 55 60
 Asp Lys Thr Pro Glu Pro
 65 70

<210> 6
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 <213> Tomato golden mosaic virus

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 TGMV Protein (aa 110-179) with alanine
 replacements (QFHN165->AFAA165).

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 Thr Leu Val Trp Gly Glu Phe Gln Val Asp Gly Arg Ser Ala Arg Gly
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 Gly Cys Gln Thr Ser Asn Asp Ala Ala Ala Glu Ala Leu Asn Ala Ser
 20 25 30
 Ser Lys Glu Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys
 35 40 45
 Tyr Leu Phe Ala Phe Ala Ala Leu Asn Ser Asn Leu Asp Arg Ile Phe
 50 55 60
 Asp Lys Thr Pro Glu Pro
 65 70

<210> 7
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 <213> Tomato golden mosaic virus

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<222> (59)..(62)

<223> Description of Artificial Sequence: Fragment of
TGMV Rep Protein (aa 110-179) with alanine
replacements (NLDR172->ALAA172).

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Thr Leu Val Trp Gly Glu Phe Gln Val Asp Gly Arg Ser Ala Arg Gly
1 5 10 15

Gly Cys Gln Thr Ser Asn Asp Ala Ala Ala Glu Ala Leu Asn Ala Ser
20 25 30

Ser Lys Glu Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys
35 40 45

Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Ala Leu Ala Ala Ile Phe
50 55 60

Asp Lys Thr Pro Glu Pro
65 70

<210> 8

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<213> Tomato golden mosaic virus

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<222> (7)..(8)

<223> Description of Artificial Sequence: Fragment of
TGMV Rep Protein (aa 110-179) with alanine
replacements (FQ118->AA118).

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Thr Leu Val Trp Gly Glu Ala Ala Val Asp Gly Arg Ser Ala Arg Gly
1 5 10 15

Gly Cys Gln Thr Ser Asn Asp Ala Ala Ala Glu Ala Leu Asn Ala Ser
20 25 30

Ser Lys Glu Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys
35 40 45

Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe

50

55

60

Asp Lys Thr Pro Glu Pro

65

70

<210> 9

<211> 70

<212> PRT

<213> Tomato golden mosaic virus

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<221> VARIANT

<222> (10)

<223> Description of Artificial Sequence: Fragment of
TGMV Rep Protein (aa 110-179) with alanine
replacement (D120->A120)

<400> 9

Thr Leu Val Trp Gly Glu Phe Gln Val Ala Gly Arg Ser Ala Arg Gly

1

5

10

15

Gly Cys Gln Thr Ser Asn Asp Ala Ala Ala Glu Ala Leu Asn Ala Ser

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25

30

Ser Lys Glu Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys

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Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe

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<210> 10

<211> 70

<212> PRT

<213> Tomato golden mosaic virus

<220>

<221> VARIANT

<222> (24)..(26)

<223> Description of Artificial Sequence: Fragment of
TGMV Rep Protein (aa 110-179) with leucine
replacements (AAA136->LLL136).

<400> 10

Thr Leu Val Trp Gly Glu Phe Gln Val Asp Gly Arg Ser Ala Arg Gly
 1 5 10 15

Gly Cys Gln Thr Ser Asn Asp Leu Leu Leu Glu Ala Leu Asn Ala Ser
 20 25 30

Ser Lys Glu Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys
 35 40 45

Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe
 50 55 60

Asp Lys Thr Pro Glu Pro
 65 70

<210> 11

<211> 356

<212> PRT

<213> Tomato golden mosaic virus

<220>

<221> UNSURE

<222> (354)

<223> Unsure about sequence assignment

<400> 11

Met Pro Ser His Pro Arg Phe Gln Ile Asn Ala Lys Asn Tyr Phe Leu
 1 5 10 15

Thr Tyr Pro Gln Cys Ser Leu Ser Lys Glu Glu Ser Leu Ser Gln Leu
 20 25 30

Gln Ala Leu Asn Thr Pro Ile Asn Lys Lys Phe Ile Lys Ile Cys Arg
 35 40 45

Glu Leu His Glu Asp Gly Gln Pro His Leu His Val Leu Ile Gln Phe
 50 55 60

Glu Gly Lys Tyr Cys Cys Gln Asn Gln Arg Phe Phe Asp Leu Val Ser
 65 70 75 80

Pro Thr Arg Ser Ala His Phe His Pro Asn Ile Gln Arg Ala Lys Ser
 85 90 95

Ser Ser Asp Val Lys Thr Tyr Ile Asp Lys Asp Gly Asp Thr Leu Val
 100 105 110

Trp Gly Glu Phe Gln Val Asp Gly Arg Ser Ala Arg Gly Gly Cys Gln
 115 120 125

Thr Ser Asn Asp Ala Ala Ala Glu Ala Leu Asn Ala Ser Ser Lys Glu
 130 135 140

Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys Tyr Leu Phe
 145 150 155 160

Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe Asp Lys Thr
 165 170 175

Pro Glu Pro Trp Leu Pro Pro Phe His Val Ser Ser Phe Thr Asn Val
 180 185 190

Pro Asp Glu Met Arg Gln Trp Ala Glu Asn Tyr Phe Gly Lys Ser Ser
 195 200 205

Ala Ala Arg Pro Glu Arg Pro Ile Ser Ile Ile Ile Glu Gly Asp Ser
 210 215 220

Arg Thr Gly Lys Thr Met Trp Ala Arg Ser Leu Gly Pro His Asn Tyr
 225 230 235 240

Leu Ser Gly His Leu Asp Leu Asn Ser Arg Val Tyr Ser Asn Lys Val
 245 250 255

Glu Tyr Asn Val Ile Asp Asp Val Thr Pro Gln Tyr Leu Lys Leu Lys
 260 265 270

His Trp Lys Glu Leu Ile Gly Ala Gln Arg Asp Trp Gln Thr Asn Cys
 275 280 285

Lys Tyr Gly Lys Pro Val Gln Ile Lys Gly Gly Ile Pro Ser Ile Val
 290 295 300

Leu Cys Asn Pro Gly Glu Gly Ala Ser Tyr Lys Val Phe Leu Asp Lys
 305 310 315 320

Glu Glu Asn Thr Pro Leu Lys Asn Trp Thr Phe His Asn Ala Lys Phe
 325 330 335

Val Phe Leu Asn Ser Pro Leu Tyr Gln Ser Ser Thr Gln Ser Ser Asn
 340 345 350

Asn Xaa Asn Ser
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<210> 12
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<212> PRT
<213> Tomato golden mosaic virus

<400> 12
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Gly Cys Ala Ala Ser Asn Asp Ala Ala Ala Glu Ala Leu Asn Ala Ser
20 25 30
Ser Lys Glu Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys
35 40 45
Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe
50 55 60
Asp Lys Thr Pro Glu Pro
65 70

<210> 13
<211> 70
<212> PRT
<213> Tomato golden mosaic virus

<400> 13
Thr Leu Val Trp Gly Glu Phe Gln Val Asp Gly Arg Ser Ala Arg Gly
1 5 10 15
Gly Cys Gln Thr Ser Ala Ala Ala Ala Ala Glu Ala Leu Asn Ala Ser
20 25 30
Ser Lys Glu Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys
35 40 45
Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe
50 55 60
Asp Lys Thr Pro Glu Pro
65 70

<210> 14
<211> 70
<212> PRT

<213> Tomato golden mosaic virus

<400> 14

Thr Leu Val Trp Gly Glu Phe Gln Val Asp Gly Arg Ser Ala Arg Gly
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Gly Cys Gln Thr Ser Asn Asp Ala Ala Ala Ala Leu Ala Ala Ser
20 25 30

Ser Lys Glu Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys
35 40 45

Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe
50 55 60

Asp Lys Thr Pro Glu Pro
65 70

<210> 15

<211> 70

<212> PRT

<213> Tomato golden mosaic virus

<400> 15

Thr Leu Val Trp Gly Glu Phe Gln Val Asp Gly Arg Ser Ala Arg Gly
1 5 10 15

Gly Cys Gln Thr Ser Asn Asp Ala Ala Ala Glu Ala Leu Asn Ala Ser
20 25 30

Ser Ala Ala Ala Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys
35 40 45

Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe
50 55 60

Asp Lys Thr Pro Glu Pro
65 70

<210> 16

<211> 70

<212> PRT

<213> Tomato golden mosaic virus

<400> 16

Thr Leu Val Trp Gly Glu Phe Gln Val Asp Gly Arg Ser Ala Arg Gly

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Gly Cys Gln Thr Ser Asn Asp Ala Ala Ala Glu Ala Leu Asn Ala Ser			
20	25	30	
Ser Lys Glu Glu Ala Leu Gln Ile Ile Arg Glu Lys Ile Pro Glu Lys			
35	40	45	
Tyr Leu Phe Gln Phe His Asn Leu Asn Ser Asn Leu Asp Arg Ile Phe			
50	55	60	
Asp Ala Thr Pro Ala Pro			
65	70		